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Patent owner:	Ecole Polytechnique Fédérale de Lausanne (EPFL)

Appn. Title: **Method and computing system for creating and displaying images with animated microstructures**

Examiner/GAU: Dennis Rosario-Vasquez /2621

Request for Continued Examination (CFR 1.114)

and Reply / Amendment

Commissioner for Patents
P.O.Box 1450
Alexandria, Virginia 22313-1450

Lausanne, July 14, 2006

Sir:

Applicants acknowledge receipt of the Office Action dated 20th of March 2006 and note the Examiner's rejections and comments made therein. Since that action was final, applicants submit the present request for continued examination according to CFR 1.114.

Applicants also come now to amend the application and provide comments in response to the Examiner's Action.

The comments in response to the Examiner's Action are listed on pages 2 to 6.

The amended claims are listed on pages 8 to 12.

In front of this page is the submission form for continued examination according to CFR. 1.114, as well as the corresponding credit card payment order for

- the one month delay fee, small entity (60$)
- The request for continued examination (CFR 1.114) fee according to CFR 1.17(e), small entity status, 395$

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Comments in response to the Examiner's action

A. Item 6 of Examiner's Action:

Applicant has canceled claim 21.

B. Item 8 of Examiner's Action:

According to Examiner's argumentation, Applicant cancels claims 39-43.

C. Item 10 of Examiner's Action:

The limitation of claim 5 and its dependent claims 6, 8, 9, and 12 has been incorporated into amended claim 1.

Fig. 8 is clearly explained in the description: "The evolution of the embedded microstructure may be defined by an animation transformation mapping between an animated dither matrix space and an original dither matrix space paved by the dither matrix." (Summary, 1st paragraph).

"The time-dependent animation transformation may either be a time-dependent geometric transformation (e.g. translation, rotation, scaling, linear transformation, non-linear geometric transformation) or any other time dependent transformation creating from at least one microstructure a transformed microstructure whose shape varies in time ... In a preferred embodiment, the animation transformation T_t provides the mapping between animated dither matrix space (u,v) and original dither matrix space (see FIG. 12)", paragraph 62 of US Pat Appl. publication 20030026500.

This means that a point of the animation space (u,v) is mapped into a point of the original microstructure space (x",y") according to the time-dependent animation transformation (e.g. a geometric transformation). Therefore, the animated microstructure space can be considered to be always animated, as soon as the display of the target image starts.

We clarify the wording within claim 1 with: "- defining a time-dependent geometric animation transformation between an original microstructure space and a transformed microstructure space specifying how said embedded microstructure spatially evolves in successively displayed target image instances".

Claim16 has been canceled.

D. Item 12 of Examiner's Action: Claim rejections as being anticipated by Drinkwater (US 5,712,731)

Drinkwater et al. disclose "a security device comprising a regular 2D array of substantially identical printed microimages .. when viewed through a two dimensional array of substantially spherical microlenses .. generate at least one magnified version of one of the microimages" (claim 1).

Both the 2D array of microimages and the microlens array are fixed physical devices that cannot move by themselves. Therefore they cannot generate an animated microstructure, i.e. a microstructure evolving over time. There is no temporal evolution: the observer has to move to obtain a different magnified view.

In addition, the setup formed by the 2D array of microimages and the microlens array is an optical device and not an electronic display. Therefore Drinkwater's security device cannot electronically display images.

We have amended independents claims claims 1, 24, 34 and 36 to incorporate the limitations of electronically displaying images.

Therefore, according to MPEP 2141.01(a), section I, "In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned", Drinkwater's invention cannot be a base for rejecting claim 1 and its dependent claims 3, 4, 5, 10 and 34

E. Item 13 (also 21) of Examiner's Action: Claim rejections as being anticipated by Miller.

Millers's publication (The motion of snakes and worms, ACM Siggraph'88) describes how to create computer animated 3D snakes and worms made of "cardinal bi-cubic parametric patches" (p. 172, 1st col. 5th paragraph) which behave naturally. The field of this publication is 3D animation and has nothing in common with the present invention, which deals with the display of target 2D images whose microstructure is independent of the original image content.

Miller's "microstructure of surface" (p. 170, right column, section 4) has nothing in common with the "microstructure" of the present invention, since it describes the surface of the animal. It is not a visual motive selected from the set of text, logo, symbol and ornament as in our invention. The snakes "diamond shaped scales", (p. 171, right column, line 7) have also nothing in common with visual motives of our microstructure.

Therefore, according to the above cited MPEP 2141.01(a), section I, Millers invention cannot be a base for rejecting claims 14, dependent claims 15 to 19, and claim 24.

However, for the sake of clarification, we have amended independent claim 1 to incorporate the restriction "where visual motive elements represented by said microstructure are independent of the original image content".

We have also canceled claims 14 to 19, so as to limit the total number of claims.

F. Item 14: Claim rejections as being anticipated by Rice (US Pat. 5,325,480A)

Rice teaches a method for creating a texture map by the repeated application of graphical elements on a texture map. This method aims at "generating a dynamically altering image" which "simulates fluid effects in real-time on a scene" (Rice, claim 1, first and second line, see column 7, lines 24-25). This invention, i.e. creating real-time effects (e.g. drops of rain, Rice, column 3, line 43) within a scene, aims at "providing a *high degree* of *realism* through fluid effect illusions without requiring substantial texture memory" (column 1, lines 28-30).

Our invention has a completely different goal, namely embedding within an image a microstructure representing a visual motive (e.g. text) which forwards a message *independently* of the global image (see our description, paragraph [0007]: "the text is embedded as a microstructure layer within a global image which may be totally independent of the text").

Rice's "graphical elements" (Rice, FIG. 2) are texture map elements (Rice, FIG. 3) which are an integral part of the image to be displayed and are therefore completey different from the visual motive represented by our microstructure, which aims at fowarding an *independent message* (e.g. publicity).

Therefore, according to the above cited MPEP 2141.01(a), section I, Millers invention cannot be a base for rejecting claims 14, and dependent claims 44 and 45.

However, for the sake of clarification, independent claims 1, 24, 34 and 36 have been amended to incorporate the restriction "where visual motive elements represented by said microstructure are independent of the original image content".

In order to limit the total number of claims, we have also canceled claims 44 and 45.

G. Item 15 (also 20, 23, 24) Claim rejections as being anticipated by Chatterjee (US Patent 7,012,616)

Chatterjee discloses a method for efficiently displaying images having transparent parts.

Chatterjee's "dithering pattern" (col. 10, line 20) has nothing to do with our "embedded microstructure which comprises at least one visual element", since dithering patterns commonly known in the art are circles, ellipses and diamonds, which should be as invisible as possible, in contrast to our patterns which are visual elements. Chatterjee's "multiple frames yielding an image animation" (col. 9, lines 33, 34) have nothing in common with our "spatially evolving microstructure" (see amended claim 1, (b)).

Chatterjee's invention and our invention are two completely distinct inventions. Therefore, according to the above cited MPEP 2141.01(a), section I, Chatterjee's invention cannot be a base for rejecting claims 1, 4, 5-9, 12, 13, claims 20-23, claims 26-35 and claims 36-37.
However, due to the additional limitations introduced into claim 1, claims 6, 8, 9 have been canceled.

H. Item 17 (+ items 18 and 19): Claim rejections in view of Lie (US Patent 5,936,606)

Lie discloses a display controller capable of displaying image overlays. However, there is no suggestion or motivation in the literature to apply the teaching of Lie to images whose microstructure is animated. Therefore, it would not have been obvious to apply Lie's teaching to the displayed images whose microstructure evolves over time. In any case, Miller's teaching is not applicable to the present invention (see argument in point E).

There is therefore no ground for rejecting claim 16, 17 and 18.

However, in order to limit the total number of claims, claims 16, 17, 18 and 19 have been canceled.

I. Items 19 : Claim rejections in view of Ostromoukhov et al. (US pat. App. 09/477,544)

Ostromoukhov teaches a color dithering method for side-side halftoning of images with non-standard or opaque inks. There is no suggestion or motivation in the literature to apply the teaching of Ostromoukhov et al. to displayed images since displays do not incorporate non-RGB or opaque

colors (phosphors or LEDs). Therefore, it would not have been obvious to apply Ostromoukhov's teaching to displayed images whose microstructure evolves over time.

There is therefore no ground for rejecting claims 18.
However, to limit the total number of claims, claim 18 has been canceled.

J. Item 20: Claim rejections in view of Ostromoukhov et al. (US pat. 5,422,742)

Ostroumoukhov et al. teach a method for creating dithered pictures by rotating dither tiles. Dither tiles rotated by a certain angle have nothing in common with a time-dependent animation transformation since the goal of dither tile rotation is to produce a single image and not an image with animated microstructure.

Therefore Ostromoukhov. et al. teaching's is not a valid ground for rejecting claim 20.

However, in order to limit the total number of claims, claim 20 has been canceled.

K. Item 21: Claim rejections in view of Terasawa

Regarding Miller, see section E above.

Terasawa describes a method for rendering 3D objects incorporating a surface with small elements.

The field of this publication is 3D computer graphics and animation and has nothing in common with the present invention, which deals with the display of target two-dimensional images whose microstructure is independent of the original image content. Fig. 2 of Terasawa describes a single hair and has nothing in common with our microstructure incorporating visual motives, which are independent of the original image content.

Therefore, according to the above cited MPEP 2141.01(a), section I, Terasawa's invention cannot be a base for rejecting claim 24.

Claim 24 has been amended to incorporate additional limitations (independence between microstructure and global image, rendering comprises a halftoning operation) creating a very clear distinction between the present invention and Miller's, respectively Terasawa's publications.

L. Item 22: Claim rejections in view of McGrew (US Pat. 6,535,638 B2)

Regarding Drinkwater, see our section D above.

McGrew teaches a "hologram reader including an electronic subsystem" (col. 7, 23-25) for verifying the authenticity of holograms. The hologram reader may be hooked onto a hierarchical computer network storing information related to the holograms (Fig. 8).

However, McGrew's invention relates to holograms which are physical diffractive devices completely different from displayable images. There is no suggestion or motivation in the literature to apply the teaching of McGrew's to displayed images whose microstructure is animated. Therefore, it would not have been obvious to apply McGrew's teaching to electronically displayed images whose microstructure evolves over time and comprises a visual motive.

There is therefore no base for rejecting claim 34.

In order to more distinctly point out the inventive elements, claim 34 has been amended to include additional limitations present in claim 1 (time-dependent animation transformation, independence between microstructure and global image, rendering comprises a halftoning operation).

M. Item 23 (also 24) Claim rejections in view of Knowlton (US Pat. 4,398,890)

Knowlton teaches how to create a design with domino patterns (claim 1). Clearly domino patterns have nothing in common with a microstructure evolving over time and comprising visual motives such as text, logo, symbol and ornament. Therefore the Knowlton's invention and our invention are completely distinct.

There is no suggestion or motivation in the literature to apply the teaching of Knowlton to our invention. Therefore, it would not have been obvious to apply Knowlton's teaching to electronically displayed images whose microstructure evolves over time where from far away mainly the image is visible and from nearby mainly the evolving microstructure is visible.

There is therefore no base for rejecting claims 24-35 on that ground.

However, in order to more distinctly point out the inventive elements, independent claims 24 and 34 has been amended to include additional limitations present in claim 1 (time-dependent animation transformation, independence between microstructure and global image, rendering comprises a halftoning operation).

Summary

In order to bring clarification, we have reduced the number of independent claims to

- one single method claim (amended claim 1, attached), which comprises additional limitations to avoid any ambiguity with the inventions mentioned by the Examiner (Drinkwater, Miller, Chatterjee, etc..),
- one "target image displayed on a computer screen" claim (amended claim 24), incorporating additional limitations to more distinctly point out the inventive content.
- Two "computing system" claims, where in claim 34 "the server computing system" computes the target image instances and in claim 36 "the client computing and display system" computes the target image instances.

Every independent claim incorporates the limitations of:

- electronically displayed target image
- time-dependent animation transformation,
- spatially evolving microstructure in successive target image instances
- independence between microstructure and global image,
- rendering comprises a halftoning operation.

The dependent claims have been amended so as to reflect the changes in the independent claims.

Conclusions

Applicants hope this answer, together with the amendments, traverses the rejections in the above identified Office Action, placing the updated claims and the new claims in condition for allowance.

Below is the new version of the claims.

Examiner may contact us by email : RD.Hersch@epfl.ch and we will phone back for a telephone discussion.

Very respectfully,

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Next pages: New version of claims